

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in this application.

Listing of Claims:

1. (Currently Amended) For use in a subterranean well completion having a wellbore through which a lower section of a tubing structure extends downwardly from a well structure engaging the tubular structure and defining a substantial outward acoustic energy dissipation path at the juncture between the lower tubing structure and an upper tubing structure section disposed above the well structure, a well operation method comprising the steps of:

acoustically transmitting a noncalibrational downhole well parameter signal, from a downhole parameter sensing location, upwardly through a major portion of the entire downhole length of the lower tubing structure section disposed above the downhole parameter sensing location toward the well structure;

converting the acoustically transmitted signal to a non-acoustic signal at a tubing structure location below the well structure; and

transmitting the converted signal upwardly past the well structure along a signal path leading to a signal receiving location.

2. (Original) The method of Claim 1 wherein:

the acoustically transmitting step includes the steps of:

connecting a first downhole transceiver structure to the lower tubing structure section,

connecting a second downhole transceiver structure to the lower tubing structure section between the well structure and the first downhole transceiver structure, the second downhole transceiver structure having a transceiver portion and a signal converter portion, and

transmitting acoustic signals from the first downhole transceiver structure through the lower tubing structure section to the transceiver portion of the second downhole transceiver structure, and

the converting step is performed utilizing the signal converter portion of the second downhole transceiver structure.

3. (Original) The method of Claim 1 wherein:

the converting step is performed by converting the acoustically transmitted signal to an electrical signal.

4. (Original) The method of Claim 3 wherein:

the converting step is performed by converting the acoustically transmitted signal to a digital electric signal.

5. (Original) The method of Claim 3 wherein:

the converting step is performed by converting the acoustically transmitted signal to an analog electrical signal.

6. (Original) The method of Claim 3 wherein:
the converting step is performed by converting the acoustically transmitted signal to an electromagnetic wave signal.

7. (Original) The method of Claim 3 wherein:
the converting step is performed by converting the acoustically transmitted signal to a photoelectric signal.

8. (Original) The method of Claim 1 wherein:
the step of transmitting the converted signal is performed by routing the converted signal upwardly through the well structure.

9. (Original) The method of Claim 8 wherein:
the routing step includes the step of extending a signal cable structure upwardly through the well structure.

10. (Original) The method of Claim 9 wherein:
the well structure is a hanger structure.

11. (Original) The method of Claim 1 wherein:
the step of transmitting the converted signal is performed by routing the converted signal upwardly around the well structure.

12. (Original) The method of Claim 2 further comprising the step of:
transmitting a control signal downwardly through the signal path to the first downhole transceiver structure.

13. (Original) The method of Claim 12 wherein:
the downhole well parameter signal is associated with a predetermined downhole well parameter, and
the method further comprises the step of utilizing the control signal to change the predetermined downhole well parameter.

14. (Original) The method of Claim 12 further comprising the step of:
utilizing the control signal to change the parameter value range associated with the downhole well parameter signal.

15. (Original) The method of Claim 12 further comprising the step of:
utilizing the control signal to change the transmission frequency of the first downhole transceiver structure.

16. (Original) The method of Claim 12 further comprising the step of:
utilizing the control signal to change the type of data transmitted by the first downhole transceiver structure.

17. (Original) The method of Claim 2 wherein:
the step of transmitting acoustic signals from the first downhole transceiver through the lower tubing structure section to the transceiver portion of the second downhole transceiver is performed utilizing at least one signal repeater carried by the lower tubing structure section between the first and second transceiver structures.

18. (Currently Amended) A subterranean well completion comprising:
a wellbore extending into the earth;
a tubular structure extending into the wellbore;
an acoustic energy dissipating well structure engaging the tubular structure, with an upper portion of the tubular structure extending upwardly from the well structure, and a lower portion of the tubing structure extending downwardly from the well structure and through the wellbore; and

a signal transmission system including:

signal transmission apparatus operable to transmit, from a downhole parameter sensing location, an a noncalibrational acoustic signal upwardly through a major portion of the entire downhole length of the lower tubing structure section above the downhole parameter sensing location toward the well structure ~~from a downhole location~~, convert the acoustic signal to a non-acoustic signal at a location on the lower tubing structure section below the well structure, and transmit the converted, non-acoustic signal from an output section of the signal transmission apparatus, and

a signal path structure coupled between the output section and a signal receiving location disposed above the well structure.

19. (Original) The subterranean well completion of Claim 18 wherein:
the acoustic energy dissipating well structure is a hanger structure.

20. (Original) The subterranean well completion of Claim 19 wherein:
the well completion is a subsea well completion, and
the hanger structure is a fluted hanger structure.

21. (Original) The subterranean well completion of Claim 19 wherein: the well completion is a surface-based well completion, and the hanger structure is a slip structure.

22. (Original) The subterranean well completion of Claim 18 wherein: the signal transmission apparatus includes upper and lower longitudinally spaced transceiver structures carried by the lower tubing structure section.

23. (Original) The subterranean well completion of Claim 22 wherein: the upper transceiver structure includes a signal converting portion operable to output the converted, non-acoustic signal to the signal path structure.

24. (Original) The subterranean well completion of Claim 22 wherein: the acoustic signal is generated by the lower transceiver structure and is indicative of a predetermined sensed well parameter.

25. (Original) The subterranean well completion of Claim 24 wherein: the signal transmission system, via the signal path structure, is further operative to transmit a control signal downwardly through the lower tubing structure section.

26. (Original) The subterranean well completion of Claim 25 wherein: the signal transmission system is further operable to utilize the control signal to change the predetermined sensed downhole well parameter.

27. (Original) The subterranean well completion of Claim 25 wherein:
the signal transmission system is further operable to utilize the control signal to change the parameter value range associated with the downhole well parameter.

28. (Original) The subterranean well completion of Claim 25 wherein:
the signal transmission system is further operable to utilize the control signal to change the type of data transmitted by the lower transceiver structure.

29. (Original) The subterranean well completion of Claim 22 further comprising:

at least one signal repeater carried by the lower tubing structure section between the upper and lower transceiver structures.

30. (Original) The subterranean well completion of Claim 18 wherein:
the signal transmission system is operable to convert the acoustic signal to an electrical signal.

31. (Original) The subterranean well completion of Claim 30 wherein:
the signal transmission system is operable to convert the acoustic signal to a digital electric signal.

32. (Original) The subterranean well completion of Claim 30 wherein:
the signal transmission system is operable to convert the acoustic signal to an analog electrical signal.

33. (Original) The subterranean well completion of Claim 18 wherein:
the signal transmission system is operable to convert the acoustic
signal to an electromagnetic wave signal.

34. (Original) The subterranean well completion of Claim 18 wherein:
the signal transmission system is operable to convert the acoustic
signal to a photoelectric signal.

35. (Original) The subterranean well completion of Claim 18 wherein:
the signal path structure extends through the well structure.

36. (Original) The subterranean well completion of Claim 18 wherein:
the signal path structure includes a signal cable structure extending
through the well structure.

37. (Original) The subterranean well completion of Claim 18 wherein:
the signal path structure includes a signal cable structure extending
upwardly along the upper tubing structure portion.

38. (Original) The subterranean well completion of Claim 37 wherein:
the subterranean well completion is a subsea well completion having
a test tree structure connected in the upper tubing structure section, and
the signal cable structure extends externally around the test tree
structure.

39. (Original) The subterranean well completion of Claim 37 wherein:
the subterranean well completion further comprises an
electrohydraulic module connected in the upper tubing structure section,
and
the signal cable structure extends interiorly through the
electrohydraulic module.

40. (Original) The subterranean well completion of Claim 37 wherein:
the subterranean well completion further comprises an
electrohydraulic module connected in the upper tubing structure section,
and
the signal cable structure extends exteriorly around the
electrohydraulic module.

41. (Original) The subterranean well completion of Claim 37 wherein:
the well structure is a hanger structure, and
the signal cable structure extends upwardly through a wall portion
of the tubing structure at the hanger structure location.

42. (Original) the subterranean well completion of Claim 41 wherein:
the wall portion is a wall portion of a ported slick joint extending
through the hanger structure.

43. (Original) The subterranean well completion of Claim 18 wherein:
the well completion is a subsea well completion,
the signal transmission system is operable to convert the acoustic signal to an electromagnetic wave signal which is transmitted into and through an adjacent portion of the earth, and
the signal path structure includes the adjacent earth portion, a transmitter structure positioned adjacent the sea bed and operable to receive the electromagnetic wave signal, and a signal output cable extending from the transceiver to the signal receiving location.

44. (Original) The subterranean well bore completion of Claim 22 wherein:
the upper transceiver structure has a generally tubular configuration, is connected in-line with the lower tubing structure section, and has an axial bore with a diameter substantially identical to that of the interior diameter of the lower tubing structure section.